Outer Continental Shelf

Performance Measures:

Safety, Environmental & Regulatory Compliance

Indicators from the U.S. Offshore Oil and Gas Industry

Final Report: 1996 & 1997

September 1998

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ACRONYMS AND ABBREVIATIONS

ACRONYMS

API	American Petroleum Institute
DMR	Discharge Monitoring Report (EPA)
EPA	U.S. Environmental Protection Agency
IADC	International Association of Drilling Contractors
IIR	Industry Incident Rate
INC	Incident of Non-Compliance (MMS)
IPAA	Independent Petroleum Association of America
MMS	U.S. Minerals Management Service
NOIA	National Ocean Industries Association
NPDES	National Pollutant Discharge Elimination System (EPA)
NTL	Notice to Lessees (MMS)
OCS	Outer Continental Shelf
OMB	Office of Management and Budget
OOC	Offshore Operators Committee
PIR	Participants Incident Rate
RP	Recommended Practice (API)
SEMP	Safety and Environmental Management Program
USCG	U.S. Coast Guard

ABBREVIATIONS

bbl(s)	barrel(s)
BOE	barrel of oil equivalent
Mcf	thousand cubic feet
RP 75	Recommended Practice for Development of a Safety and Environmental Management Program for OCS Operations and Facilities (API)

EXECUTIVE SUMMARY

In 1991, the Minerals Management Service (MMS) announced its Safety and Environmental Management Program (SEMP) initiative. SEMP consists of a series of integrated management systems designed to improve the ability of U.S. outer continental shelf (OCS) oil and gas facilities to operate in a safe and environmentally responsible manner. Since that time the MMS has worked with industry leaders to promote the voluntary adoption of SEMP by all U.S. OCS operators. Through a series of annual implementation surveys conducted by the American Petroleum Institute (API), it has become clear that the majority of OCS operators have developed and are now implementing their SEMP plans. Given SEMP's growing maturity, the MMS became interested in finding a way to measure its operational impact.

Late in 1996, the MMS, the U.S. Coast Guard (USCG) and offshore industry formed a work group. This group was charged with developing quantitative measures providing insight into the safety, environmental, and regulatory compliance performance of the U.S. OCS oil and gas industry affected by successful implementation of SEMP. Over the course of the next year, the OCS Performance Measures Work Group successfully developed and tested a consensus set of outcome-driven performance measures that include:

- ✓ Production operations employees' (company and contractor) total recordable and lost workdays incident rates
- ✓ Drilling operations employees' (company and contractor) total recordable and lost workdays incident rates
- ✓ Construction operations employees' (company and contractor) total recordable and lost workdays incident rates
- ✓ Fire/explosion incident rate
- ✓ Blow-out incident rate
- ✓ Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System (NPDES) permit discharge exceedence rate
- ✓ Oil spill incident rate — number and volume of oil spills (< 1 barrel)
- ✓ Oil spill incident rate — number and volume of oil spills (≥ 1 barrel and < 10 barrels)
- ✓ Oil spill incident rate — number and volume of oil spills (≥ 10 barrels)
- ✓ MMS production incidents of non-compliance (INCs) rate, and
- ✓ MMS drilling, workover, completion, and well plugging and abandonment INC rate

The MMS collects or generates over half of the information needed to calculate these measures. The MMS did request, in April 1998, that each OCS operating company voluntarily submit the remaining related information needed to fully compile the OCS Performance Measures. Sixty OCS operators, representing over 80% of total OCS oil and gas production responded to this request. This report documents the collaborative work of the MMS and offshore industry to build and collect information on the OCS Performance Measures. The report also provides the final aggregate results from 1996 and 1997 for each of these measures.

Though two data points (i.e., 1996 and 1997) are not enough data to develop trends, they provide an important starting point. Initial results from the OCS Performance Measures have already provided important information not previously available. For example, we can now more accurately predict that between 20,000-25,000 people are working on the OCS at any given moment. Because of the split-shift work schedules used offshore, this means that between 40,000-50,000 people derive their annual livelihood working on the OCS.

The results from the 1996-1997 OCS Performance Measures also provide an important starting point for both the MMS and offshore industry to measure bottom-line performance in addition to just regulatory compliance. The data contained in this report will also allow OCS operators and the MMS to more effectively target resources in our individual and collaborative efforts to improve the overall safety, environmental, and regulatory compliance performance of the offshore industry. The overall performance of OCS operators, as shown in the following summary table, is stable or improving in many of the measures; the table also makes clear that there are still many opportunities for improvement.

Summary of the 1996-1997 OCS Performance Measures Survey		
Better	**Flat**	**Worse**
Production: Recordable Injury	Fire and Explosion	Drilling: Recordable Injury
Production: Lost Workday Injury	Oil Spills: Volumes ≥ 10 bbls	Drilling: Lost Workday Injury
Construction: Recordable Injury	Oil Spills: Total Volume	Oil Spills: Number ≥10 bbl
Construction: Lost Workday Injury		Oil Spills: Volumes < 1 bbl
Blowout Rate		Production INC's
Oil Spills: Number < 1 bbl Number ≥ 1 and < 10 bbl		Drilling INC's
Oil Spill: Volumes ≥ 1 and < 10 bbl		
NPDES Exceedence Rate		

The data provided by the 1996-1997 survey has already allowed the MMS to identify pacesetting companies in each of the areas measured by the OCS Performance Measures. Pacesetters (both large and small) have been recruited by MMS to share management system approaches they employ to achieve superior performance in upcoming, MMS-industry jointly sponsored best practice sharing workshops.

Lastly, the OCS Performance Measures provide a much-needed perspective on the actual safety and environmental performance of OCS operators. Combined with related data on regulatory compliance, the MMS and OCS operators now have important information to help shift to a more performance-driven regulatory program for OCS oil and gas operations.

INTRODUCTION

This report and the appendices that accompany it describe the development, implementation, and results from the 1996-1997 OCS Performance Measures survey. This survey is the product of a two-year collaborative effort between the OCS industry and the MMS to develop a widely-used set of consistently-defined safety and environmental performance measures. This effort was initiated by the MMS, but was quickly agreed to by the major trade associations for the OCS oil and gas industry. Both the MMS and OCS industry recognized that credible and replicable data describing the bottom-line performance of the industry was badly needed. These OCS Performance Measures, and the process used to develop and implement them, are the products of consensus derived from a joint work group formed by the MMS and OCS industry.

BACKGROUND

History

Origins: Performance-Based Regulation

During the 1990's the MMS has been reworking its approach to regulating the exploration for, and development of, the oil and gas resources of the U.S. OCS. Previously, the MMS had worked to foster application of the best available technologies in these activities through use of consensus industry standards. These standards were supplemented in the MMS regulations with prescriptive directives where the Agency determined they were inconsistent with, or lacked, its regulatory objectives. This approach worked relatively well and the offshore industry took great strides in making energy resources available to the U.S. in a safe and environmentally responsible manner.

Despite the strides made by the offshore industry in developing and applying technological solutions, the continued risks posed by this industrial activity to both humans and the environment argued for a new approach. It became increasingly apparent that future gains in the safety and environmental arenas needed to come from concentrating more closely on the human and organizational elements in offshore operations and their contributions to accidents. Research in this area has indicated that as much as eighty percent of all accidents can be attributed in some way to human error or organizational shortcomings.

In 1990, both the MMS and the Marine Board of the National Academy of Sciences undertook separate but related studies of one of the MMS' main lines of defense against injury or pollution: the OCS Inspection Program. The results of both studies indicated that over reliance on inspection and enforcement tools was inadvertently fostering a compliance mentality among many OCS operators. This focus on compliance, though still important, was obscuring the operators' responsibility to target and manage their performance to exceed the minimum thresholds established by regulation. Out of these studies sprung the MMS Safety and Environmental Management Program (SEMP).

The SEMP program was the Agency's first application of a safety management system approach on the OCS. Shortly after the MMS introduced its SEMP concept in the *Federal Register* (1991), the offshore industry requested that it be given a chance to develop and implement a consensus industry standard in cooperation with the Agency. Their request led to the development of API's

Recommended Practice for Development of a Safety and Environmental Management Program for Outer Continental Shelf (OCS) Operations and Facilities (RP 75). A companion standard, *Recommended Practice for Design and Hazards Analysis for Offshore Production Facilities* (RP 14J), was also developed by the API and MMS.

The MMS publicly recognized RP 75 and joined forces with the API, the Independent Petroleum Association of America (IPAA), the Offshore Operators Committee (OOC), and other industry leaders to promote voluntary adoption of RP 75. Any management system built upon a standard such as RP 75 must reflect the unique structure and business practices of each company that adopts it. Therefore, the MMS felt that it should provide the opportunity for OCS operators to customize their SEMP plans and implement them on a voluntary basis.

Four annual SEMP implementation surveys conducted by the API, IPAA, OOC, and MMS have indicated that the vast majority of OCS operators have developed SEMP plans and are in various stages of implementing them in their offshore activities. At the beginning of 1998, for example, this annual survey showed that the SEMP plans of larger oil and gas producers were generally in place. Smaller producers, on the whole, are in the process of implementing their SEMP plans.

Uses for Performance Measures Data

The MMS and the OCS operators saw the following benefits from having performance measures:

- *Benchmarking:* Performance measures provide the MMS and industry with an objective basis upon which to identify "pacesetter" companies. These companies will be asked to make presentations on how they achieved their performance at periodic workshops sponsored by MMS and industry. Sharing best practices can elevate performance in all companies.

- *Relative Perspective:* Company management will be better able to focus their continuous improvement efforts if they know how offshore operators as a group are faring, and where their own company/facility fits in the range of performance for each measure. This knowledge should lead to more cost-effective corrective actions that can help prevent accidents and thereby protect people and the environment. This perspective may also help industry focus and maximize its research and management systems audit efforts.

- *Regulatory and Research Perspective:* Knowing how offshore operators as a group are performing across each measure will allow MMS to better focus its regulatory and research programs. MMS will be able to focus on areas where the performance measures indicate OCS operators as a whole are having difficulty meeting MMS expectations. MMS will be better able to leverage its limited resources by redirecting research efforts, promoting appropriate regulatory initiatives, and shifting inspection program emphasis. Additionally, the MMS will use these measures in combination with other internal analyses during annual performance reviews the Agency conducts with each OCS operator.

- *Public Information and Relations:* Offshore operators and organizations will have a credible data source that will enable them to better demonstrate the long-held opinion that OCS operators have an excellent safety and environmental record. Because this data will be normalized, where appropriate, it will provide more consistent information that is comparable across the companies operating on the OCS. This information will also begin to serve as a basis to compare the relative records of this industry with other industries.

- *Alternative Approaches to Regulatory Compliance:* Many operators have expressed a desire to see MMS grant permission on ad hoc requests for alternative compliance with specific Agency regulatory objectives for solid performers who have demonstrated successful implementation of their SEMP plans. Such an approach could provide operators the regulatory flexibility to more efficiently, and possibly more effectively, meet the Agency's performance goals. The OCS Performance Measures will be one verifiable gauge of the reasonableness of such requests and will be a starting point for dialog with MMS. MMS expects that operators will want to use additional performance indicators and information related to their management's proactive commitment to safe and environmentally sound operations to support each specific request. Such "leading" indicators of performance often focus on the "quality" of the implementation of individual SEMP elements.

Development of the Measures

In 1996, following the second annual RP 75 implementation survey, the MMS recognized that SEMP was gradually working its way into the business practices of most OCS operators. The MMS and the offshore industry then joined forces again – this time to develop an initial set of performance measures to help determine the effectiveness of company implementation of SEMP. The objective of this effort was to develop a plan for scoping, implementing, gathering, reporting, and benchmarking a defined set of offshore safety and environmental performance measures. An OCS Performance Measures Work Group was formed and asked to forge a consensus set of measures that could be implemented OCS-wide. Table 1 lists the Work Group member agencies, associations, and companies.

Table 1. OCS Performance Measures Work Group Members

Minerals Management Service	Conoco Inc.
U.S. Coast Guard	Enron Oil & Gas Company
American Petroleum Institute	Exxon Company USA
International Association of Drilling Contractors	Kerr-McGee Corporation
Independent Petroleum Association of America	Marathon Oil Company
National Ocean Industries Association	Mobil E&P U.S. Inc.
Offshore Operators Committee	Murphy E&P Company
Amoco Production Company	Newfield Exploration Company
BP Exploration Inc.	Shell Offshore Inc.
Burlington Resources	Taylor Energy Company
Chevron USA Inc.	Texaco E&P Inc.
Cockrell Oil Corporation	Vastar Resources Inc.

The Work Group met as a whole in December 1996 and February 1997. Numerous subgroup meetings and teleconferences were held to debate candidate performance measures and to handle related assignments. By the Spring of 1997, the Work Group had forged their consensus set of OCS performance measures. The set contained eighteen individual measures reflecting different facets of the safety, environmental, and regulatory compliance performance of OCS operators. The Work Group further agreed that MMS should collect all OCS Performance Measures data surveys, but disseminate the results in aggregate form only.

Each of the OCS Performance Measures is classified as an outcome-driven measure (i.e., quantification of an end result). Though the Work Group clearly recognized the value of more process-oriented measures, the consensus was to leave these sometimes less-easily quantifiable measures to the discretion of individual companies, at least for the present.

Pilot Project and Industry Outreach

With a draft set of performance measures in hand, the Work Group ran a pilot survey using real data from the 17 companies represented in the group. Each company was asked to submit available data for calendar years 1995 and 1996 to the MMS. The MMS, in turn, compiled all data and reported back on the results of the pilot survey to the Work Group. After making some minor improvements to definitions and the measures themselves, the Work Group recommended that several workshops be held to communicate its consensus set of performance measures to the wider audience of OCS operators. The MMS, API, IPAA, OOC, National Ocean Industries Association (NOIA), and the International Association of Drilling Contractors (IADC) sent notices to all segments of the OCS industry to help advertise the workshops.

Identical workshops were conducted in New Orleans and Houston in September 1997, and Camarillo, California, in November 1977. Over 400 representatives from OCS operating companies and their contractors attended these workshops.

The products of the Work Group were posted on the MMS Safety Page (http://www.mms.gov/eod/safety.htm) on the Internet shortly after the workshops. These products included the final report of the Work Group, complete with detailed definitions for each performance measure, and the draft form MMS and industry had agreed to use to survey all OCS operators. Much of this material had already been given to workshop attendees.

Data Request

The MMS then published two notices in the *Federal Register* (September 5, 1997 & February 2, 1998) advertising its intent to ask all OCS operators to voluntarily report their company's data for each OCS Performance Measure beginning in 1998. These notices drew limited comment from the public, though some concern was expressed by the IADC about the perceived inconsistencies between these measures and those they collected. After obtaining all necessary Federal information collection authorizations, the MMS issued a Notice to Lessees (NTL 98-6N) on April 1, 1998, requesting that all OCS operators complete the approved data collection survey form for the years 1996-1997 and voluntarily return it to the MMS by May 4, 1998.

Methodology of Survey

During its deliberations, the OCS Work Group designed the data collection form distributed to all OCS operators as part of NTL 98-6N (see *Appendix 1*). This form requested the raw data required to calculate the various performance measures. In many cases, the actual measure was derived using both company and MMS data, therefore very few calculations by the participating operators were necessary. In many cases, the data needed by operators to complete the data collection form was readily available. Some operators, however, reported difficulty in retroactively calculating the number of hours worked in their production, drilling, and

construction operations – particularly for work performed by contractors. In these cases, operators were told that their best professional estimate was acceptable for 1996 and 1997 data but it was expected that they would more accurately track this information beginning in 1998.

Information gathered from each OCS operator was combined with data previously collected by the MMS on that operator either through its permitting, incident reporting, or inspection programs. The MMS attempted to validate information it had compiled by contacting all survey participants and faxing their company's data set to them for review. Though numerous discrepancies were discovered in this process, few were deemed large enough to significantly influence the overall data set. Where significant discrepancies were identified, the MMS contacted companies and requested that they reexamine their data. Data revisions were made where possible, and operators were instructed how to formally request other data changes.

Following validation, the MMS constructed draft charts depicting aggregate data for each performance measure. The draft charts were scrutinized by a subset of the full Work Group known as the OCS Performance Measures Steering Group. MMS investigated several anomalous data points upon request of the Steering Group and made additional improvements. The final versions of these charts are attached to this report (see *Appendix 2*).

RESULTS

By their numeric nature, performance measures may imply a level of precision that may be misleading due to the complexity of the activities that they attempt to quantify. The individual data should always be viewed as a departure point for further analysis and examination, and not absolute answers in themselves. The real value of this type of outcome measure is in the improved focus and comparative analyses on observed trends and ranges of data that they provide.

Contextual Background Discussion & Table

The Steering Group believed that some basic contextual information on the magnitude and scale of OCS operations would provide useful background to readers and users of this report. With this in mind, the MMS has compiled Table 2 to serve both as a backdrop and summary of the data provided by the OCS Performance Measures survey for 1996 and 1997. Some of the more notable points from this data are:

- ✓ Over 60 OCS operators submitted data for at least one year of the two-year survey period; most submitted data for both years. These survey participants, represent nearly 2/3 of all designated OCS operators. For the purpose of this survey, most companies consolidated data for all their subsidiary companies in one report. It is important to note that some operators provided estimates for hours worked by their employees and contractors since the data request required retroactive data collection.
- ✓ All OCS operators combined produced over 462 million barrels of oil from the OCS in 1997 - representing 20% of total 1997 U.S. oil production. Participants in this survey represented over 92% of total OCS oil production.
- ✓ OCS operators also produced nearly 5.2 trillion cubic feet of natural gas in 1997 – representing 27% of total 1997 U.S. natural gas production. Participants in this survey represented nearly 77% of total OCS natural gas production.

- ✓ Survey participants represented nearly 82% of total 1997 OCS oil and natural gas production on a barrel of oil equivalent basis.
- ✓ Survey participants drilled 75% of the over 1300 wells spudded on the OCS in 1997.
- ✓ Survey participants operated over 75% of the nearly 3,900 platforms on the OCS in 1997.
- ✓ In 1997, survey participants reported that they and their contractors logged nearly 73 million hours worked. Drilling accounted for 44% of total hours worked; production operations accounted for 40%, and construction operations were 16%. Over 81% of overall hours worked were logged by contractors; in the drilling and construction sides of the business this figure is approximately 96% and 98%, respectively.

Table 2. Summary of Results for 1996-97 OCS Performance Measures

	1996	1997	Units
Total Participants	54	60	
Total Wells Spudded	1109	1330	wells
Participants' Wells spudded	**791**	**1003**	wells
Total OCS Platform counts	3884	3866	platforms
Major	1967	1942	
Minor	1917	1924	
Participant's Platforms counts	**2228**	**2990**	platforms
Major	1441	1434	
Minor	787	1556	
Overall Reported Hours Worked*	**59,119,692**	**72,907,353**	hrs
Company	12,461,879	13,723,883	
Contractor	46,657,813	59,183,470	
Contractor % of Total	78.9%	81.2%	
Overall Recordable Injuries/Illnesses	1,002	1,100	
Company	192	168	
Contractor	810	932	
Contractor % of Total	80.8%	84.7%	
Overall Lost Workday Cases	454	507	
Company	89	88	
Contractor	365	419	
Contractor % of Total	80.4%	82.6%	
Overall Recordable Incident Rate	**3.390**	**3.018**	
Company	3.081	2.448	
Contractor	3.472	3.150	
Overall Lost Workday Incident Rate	**1.536**	**1.391**	
Company	1.428	1.282	
Contractor	1.565	1.416	
OCS Total BOE Production (5.61MCF/BOE)	1,349,761,316	1,386,218,304	BOE
Oil & Condensate Production	433,538,113	463,422,064	bbls
Gas Production	5,143,677,063	5,180,578,090	MCF
Participants' Production (5.61MCF/BOE)	**1,119,217,154**	**1,135,895,875**	BOE
BOE Production	1,119,217,154	1,135,895,875	BOE
Participants' % BOE Production	82.92%	81.94%	BOE
Oil Production	397,212,475	428,367,993	bbls
Participants' % Oil Production	91.62%	92.44%	
Gas Production	4,050,446,251	3,969,231,418	MCF
Participants' % Gas Production	78.75%	76.62%	

PRODUCTION OPERATIONS	1996	1997	Units
Production Hours Worked*	26,931,585	29,369,456	hrs
Company	11,299,521	12,291,422	hrs
Contractor	15,632,064	17,078,034	hrs
Contractor % of Total	58.04%	58.15%	
Production Recordable Injury Cases	475	439	
Company	190	161	
Contractor	285	278	
Contractor % of Total	60.00%	63.33%	
Production Lost Workday Cases	231	216	
Company	88	85	
Contractor	143	131	
Contractor % of Total	61.90%	60.65%	
DRILLING, WORKOVER, & ALLIED SERVICES OPERATIONS			
Drilling Hours Worked*	26,098,790	32,050,925	hrs
Company	980,090	1,192,565	hrs
Contractor	25,118,700	30,858,360	hrs
Contractor % of Total	96.24%	96.28%	
Drilling Recordable Injury Cases	439	564	
Company	2	7	
Contractor	437	557	
Contractor % of Total	99.54%	98.76%	
Drilling Lost Workday Cases	177	248	
Company	1	3	
Contractor	176	245	
Contractor % of Total	99.44%	98.79%	
CONSTRUCTION OPERATIONS			
Construction Hours Worked*	6,089,317	11,486,972	hrs
Company	182,268	239,896	hrs
Contractor	5,907,049	11,247,076	hrs
Contractor % of Total	97.01%	97.91%	
Construction Recordable Injury Cases	88	97	
Company	0	0	
Contractor	88	97	
Contractor % of Total	100.00%	100.00%	
Construction Lost Workday Cases	46	43	
Company	0	0	
Contractor	46	43	
Contractor % of Total	100.00%	100.00%	

** Some participants estimated hours worked for one or more years in different categories*

Qualifications

Before reviewing 1996 and 1997 data for each of the OCS Performance Measures it is important to make several key qualifications. Some of these have been stated in a general sense before, but it bears repeating that the value of this information is not in the number of decimal places of accuracy. The value is in the relative perspective that is focused on the very important issues of the protection of human life and health and of the environment, as well as on the issue of regulatory compliance. Some of the key qualifications that should be stated are:

- ✓ This first survey of OCS operators captured fewer operators than the Work Group had hoped it would. However, the sample size is quite significant – a point that was made in the previous section of the report. This first survey was logistically more difficult for many operators to participate in because it required retroactive analysis of, and reporting on, data some operators had not previously collected. The Work Group fully expects that the participation rate will increase in 1998 because all operators were informed of the need for this data in Fall 1997 in time to set up tracking systems. The MMS did, in fact, hear from a number of operators who have indicated that they will participate in future surveys.
- ✓ There is no regulatory requirement for OCS operators to track the number of hours worked by either their own company or, especially, by their contractors. This data is, however, very important to developing normalized injury/incident rate data. Heretofore, many operators have not asked contractors to report on hours worked. For the purposes of this survey, some operators used their best estimates to prepare a tally of hours worked. Given the importance of this data to normalizing the different activity levels of operators, the Work Group felt an informed estimate would be better than no data. Operators are now well aware of the need for these hours, thus this information should be substantially more reliable in 1998.
- ✓ It is important to note that for any incident rate the high value in any one year is extremely likely to belong to only one company. In addition, very few operators had the misfortune to own the high value in both years. Conversely, the low value for any incident rate is likely to be shared by several operators in both years.
- ✓ Significant differences between companies' internal procedures and some confusion in the categorization of various incidents still exists, despite the efforts of the Work Group to define the data elements and to educate the broader group of OCS operators. Some key examples might cover: whether construction activities are tracked separately from production activities; whether small, non-process fires were reported to MMS; whether a light-duty (aka, restricted duty) case is logged as a recordable and lost workday case, etc. Therefore, some margin of variation can be expected in how different companies interpreted and applied the reporting requirements during their calculation of data from 1996 and 1997. Companies were encouraged to harmonize reporting requirements with the definitions given for the OCS Performance Measures and to be consistent.
- ✓ Finally, it is important to note that this survey presents data for only two data points (i.e., two years). A trend can not be drawn from two data points. These data points do, however, provide both an excellent starting point and very valuable information that can be used to examine current performance and contrast future related performance.

Definition of Terms

Some terms used in the reporting of the OCS performance measures require explanation. The key terms seen on most charts (see *Appendix 2* for the individual charts) are:

- *Average* Incident Rate: total of all incident rates / total number of reporting companies
- *High* Incident Rate: the highest incident rate calculated for any reporting company
- *IIR*: Industry Incident Rate - calculated using purely raw data for all OCS operators; note that the IIR is not calculated using individual company incident rates. This measure is, therefore, the best surrogate for discussing the overall performance of the OCS industry. The IIR is reported for cases where MMS had and provided all necessary data for that particular measure.
- *Low* Incident Rate: the lowest incident rate calculated for any reporting company
- *Median* Incident Rate: the middle value in the range of all individual incident rates
- *PIR*: Participants Incident Rate – calculated using purely raw data for all participants; note that the PIR is not calculated using individual company incident rates. This measure is the best surrogate for discussing the OCS industry's performance in an area where MMS did not have all necessary data. The PIR is reported only for cases where participants provided some of the necessary data for that particular measure.

General Observations

At no point during its review of the 1996-1997 survey results did the Steering Group find any of the values for individual performance measures to be counterintuitive. However, it agreed that the wide range of performance within many measures clearly shows that there is room for improvement.

This compilation of performance measures indicates that OCS operators' performance improved or was flat in more areas than it declined. Table 3 summarizes the general observations of the Steering Group on the 1996 & 1997 OCS Performance Measures results.

Table 3. Overall Observations on 1996-1997 OCS Performance Measures

Better	Flat	Worse
Production: Recordable Injury	Fire and Explosions	Drilling: Recordable Injury
Production: Lost Workday Injury	Oil Spills: Volumes ≥ 10 bbl	Drilling: Lost Workday Injury
Construction: Recordable Injury	Oil Spills: Total Volume	Oil Spills: Number ≥10 bbl
Construction: Lost Workday Injury		Oil Spills: Volumes < 1 bbl
Blowout Rate		Production INC's
Oil Spills: Number < 1 bbl Number ≥ 1 and < 10 bbl		Drilling INC's
Oil Spill: Volumes ≥ 1 and < 10 bbl		
NPDES Exceedence Rate		

Measure by Measure Discussion

The consensus observations of the Steering Group on each separate measure are presented below. This discussion is perhaps best reviewed while examining the applicable chart (see *Appendix 2* for a copy of each chart). It should also be noted that each of the OCS Performance Measures is, in effect, a negative outcome. Therefore, when an incident rate declines it is equivalent to saying performance improved – and vice versa.

- **Production Operations Recordable Injury/Illness:** Most OCS operators who participated in the survey submitted data on their production operations. These participants represented nearly 72% of OCS production and 3/4 of both wells spudded and installed platforms. In 1997, the PIR can be interpreted to mean that 3 out of each 100 employees incurred a recordable injury during OCS production operations. The 14% decline in the PIR from 1996 to 1997 shows encouraging performance. Most companies, as reflected by the relatively lower median and average values, are doing better than is reflected by the PIR; this can be attributed to the strong effect exerted by the high outlier value.

- **Production Operations Lost Workday Injury/Illness:** The PIR in 1997 indicates that nearly 1.5 out of each 100 employees incurred an injury during the year serious enough to cause them to lose time on the job. When contrasted with similar information for production operations recordable injuries, the PIR values for these two measures show that 1 out of every 2 employees who had a recordable injury in 1997 went on to lose time from the job. As with recordable cases, the production operations lost workday incident rate declined (performance improved) from 1996 to 1997; nearly 15% for lost workday rates.

- **Drilling Operations Recordable Injury/Illness:** Perhaps due to the largely contractual nature of OCS drilling operations, participation in the drilling safety measures was lower than in the case of production operations. Nonetheless, participants in this portion of the survey represented over 70% of production, 2/3 of wells drilled, and over 60% of installed platforms. The data reported by participants indicate that nearly 3.5 out of each 100 drilling employees incurred a recordable injury during 1997. Overall, industry performance from 1996 to 1997, as measured by the PIR, worsened marginally for both the recordable (3.4 → 3.5) and lost workday (1.4 → 1.6) drilling cases. It should be noted that even though these incidents are normalized for the different activity levels between years, they do not qualitatively reflect the fact that 1997 was a very active drilling year. The total number of hours worked in the drilling, workover, and allied services category increased nearly 23% from 1996 to 1997. Many new short-service employees entered the workforce during this time and many rigs either new to the Gulf, or that had been stacked, were quickly called into service. Steering Group members believe that a disproportionate share of accidents occur during this start-up phase of operations.

- **Drilling Operations Lost Workday Injury/Illness:** Paralleling observations made for production operations, nearly half (44%) of recordable drilling injuries become lost workday cases. This means that nearly 1 out of every 2 recordable injuries are serious enough to require the injured employee to miss time from work. Both drilling recordable

and lost workday rates are only marginally higher in 1997 than corresponding production rates; these rates were better than production rates in 1996.

- **Construction Operations Recordable Injury/Illness:** Participation in this category of operations by survey respondents was markedly lower than for either production or drilling activities. Many companies reported that their current record-keeping systems did not easily allow them to segregate construction activities from, primarily, their production operations. As a whole, however, the participants were responsible for 60% of all OCS production, more than half of all OCS wells drilled, and half of all platforms installed in the OCS. Recordable rates in this category, as measured by the PIR, declined (performance improved) from 1996 to 1997 (2.9 → 1.7). That translates to 1.7 out of each 100 employees in construction operations incurring a recordable injury. It is interesting to note that the construction rates are lower (better) than those in production operations. This measure is strongly influenced by several high rates as can be seen from the jump in median value and slight increase in average value.

- **Construction Operations Lost Workday Injury/Illness:** As also seen in the recordable injury rates in construction operations, the participants incident rate decreased (performance improved) markedly – nearly 50% in the case of lost workday injuries. However, the worst case performance (highest incident rate) declined strongly in this measure – again by nearly 50%; this in turn caused a corresponding decline in the average performance. As was also true for production and drilling operations, the data for construction operations indicated that nearly 1 of each 2 injuries serious enough to be categorized as recordable cause employees to lose time from the job.

- **Fire and Explosion Incident Rate:** It is worth noting that industry reporting standards in the U.S. differ markedly for this measure. All companies report serious incidents, but some report all fires no matter how insignificant (trash can, ash tray, galley grease, etc.). The MMS has directed companies to do just this. At present, all fires and explosions are given equivalent weighting. The Agency is working to improve the definition and reporting requirements for fires and explosions. Also, the MMS is working to establish an internal threshold for reported fires below which they are discounted. Overall, the industry incident rate for fires and explosions increased (performance worsened) by nearly 24% from 1996 to 1997. Much of this difference may be due to better reporting by all OCS operators. Many operators are doing better than industry as a whole as indicated by the relatively lower average and median incident rate values.

- **Blowout Incident Rate:** The incident rate for blowouts on the OCS declined (performance improved) from 1996 to 1997 by about 17%. In 1997, the incident rate shows that the equivalent of 3 wells out of every 1,000 drilled on the OCS blow out. All blowouts, including any well (drilling, workover, recompletion, etc.) placed on a choke to control pressure, must be reported to the MMS by OCS operators. Though there is a fairly wide variation in the severity of blowouts the measure treats them equally because they are infrequent enough to be analyzed individually.

- **Oil Spill Number Incident Rate: All categories (< 1 bbl, ≥ 1 and < 10 bbl, ≥ 10 bbl):**

Oil Spill Number Incident Rate		
	1996	**1997**
< 1 bbl	0.42	0.34
≥1 and < 10 bbl	0.024	0.006
≥ 10 bbl	0.0027	0.0031

The OCS Performance Measures show that there was a 19% decline (performance improvement) in the small spill incident rate from 1996 to 1997. These measures also indicate a 75% decline (performance improvement) in mid-size spill incident rate from 1996 to 1997. Lastly, the data show a 15% increase (performance worsening) in large spill incident rate during this period. There were 37 times more small spills than mid- and large-size spills combined in 1997. Also, there were 110 times as many small spills as there were large spills in 1997.

- **Oil Spill Volume Incident Rate: All categories (< 1 bbl, ≥ 1 and < 10 bbl, ≥ 10 bbl):**

Oil Spill Volume Incident Rate (barrels per million barrels produced)		
	1996	**1997**
< 1 bbl	0.16	0.26
≥1 and < 10 bbl	0.19	0.06
≥ 10 bbl	1.16	1.14
Total	***1.51***	***1.46***

Data used for spills in the <1 barrel category was provided by the OCS operators. This data is reported to the U.S. Coast Guard's National Response Center, however, due to the volume of reports it is rarely modified if later analysis shows small spill volumes are lower or higher than initially reported. In 1996 and 1997, about 1.5 barrels of oil were spilled for every million produced on the OCS. The small spill volume incident rate increased (performance worsened) 63% from 1996 to 1997. These data also show that the mid-size spill volume incident rate declined (performance improved) 68% from 1996 to 1997. The volume incident rate for larger oil spills declined (performance improved) marginally (2%) from 1996 to 1997.

- **NPDES Exceedence Incident Rate:** The exceedence incidence rate declined (performance improved) 11% from 1996 to 1997. The NPDES is administered by the Environmental Protection Agency (EPA), but permit compliance is spot checked on the OCS by the MMS. As with small spill volumes, this information is provided by the OCS operators themselves. This data, though reported to the EPA by operators, is not easily accessible from the EPA databases for this purpose.

- **MMS Production INC Incident Rate:** Production INC incident rate increased (performance worsened) nearly 7% from 1996 to 1997. It is important to note that though this measure seems to indicate that INC's were issued by MMS on nearly 5 of every 100 components inspected in 1997, MMS inspectors issue INC's for many regulatory violations that are not related to components. Many operators are doing better than industry as a

whole as indicated by observing that both the average and median values declined. This is the result of a strong influence by the worst performers in this category

- **MMS Drilling/Workover INC Incident Rate:** The drilling and workover INC incident rate increased (performance worsened) nearly 13% from 1996 to 1997. In this category, all incident rates increased (worsened). In 1997, MMS issued 1 INC for roughly every 4 drilling rig inspections conducted on the OCS. Here it may be useful to reiterate the observations made earlier about how the sizeable increase in drilling activity that took place in 1997 (20% more hours worked) likely brought with it the usual problems incurred with short-service employees and new rigs brought into service (i.e., start-up problems).

Key Findings

The 1996-1997 data survey conducted under the OCS Performance Measures project has revealed for the first time information that is valuable to both OCS operators and the MMS. More importantly, the information derived from these now widely-used, consistently-defined outcome measures can help improve performance in the area of human and environmental protection during OCS oil and gas operations. The data points from this first round will serve as a baseline from which future improvements can both be planned and measured.

The OCS Performance Measures project documented, more accurately than has been done before, the number of people employed on the OCS at any given point in time. Extrapolating from the hours worked as reported by participants to those that would be reported for all operators, it appears fair to estimate that from 20,000-25,000 workers are present on the OCS at any time. Given the split shift employed by OCS operators and contractors, this number reveals an overall employment level of 40,000-50,000 people gaining full-time work on the OCS. These numbers do not, of course, include the numerous onshore support employees on the staff of the operators nor their many suppliers.

The OCS industry and the MMS now have data upon which the relative performance of different companies can begin to be examined. Normalizing performance has, in effect, leveled the playing field for operators of all sizes. The MMS can now better compare one company's performance against another's, as well as against the industry as a whole. Operators also now have a better sense of how they are performing relative to the overall industry. These insights will allow more thoughtful and probing questions to be asked and should, thereby, lead to more efficient and effective remedial efforts. Conversely, this information will also help determine which companies are setting the pace for safety and environmental protection. The OCS industry looks to those companies to help improve the performance of the overall industry by sharing best practices.

This survey provided much needed perspective on the role that contract employees play in OCS oil and gas operations. Overall, the OCS Performance Measures survey shows that 82% of all employees on the OCS are contractors; in the drilling and construction facets of operations the corresponding number approaches 98%. This information makes more urgent than ever the individual and collaborative efforts of the OCS operators and the MMS to ensure that all contractors meet minimum requirements and are appropriately considered by, and integrated into, the operator's safety and environmental management program.

Lastly, though much of this information has been available to the MMS and made public previously, it bears repeating that the oil spill data show that OCS operators spill only about 1.5 barrels of oil for every 1,000,000 barrels produced. The spill number and volume incident rate data show that, in 1997, more than 75% of the total volume of oil spilled came in accidents resulting in spills equal to or greater than 10 barrels. However, this size spill occurs only once in every 110 spills. In other words, the vast majority of spills that occur on the OCS are in the less than 1 barrel category, but this category is responsible for only 18% of all oil spilled during OCS oil and gas operations.

LESSONS LEARNED

As with any endeavor, the development and initial implementation phase reveals many opportunities for improvement. This exercise has been no exception. While much valuable information has been gained during the 1996-1997 OCS Performance Measures data collection and analyses, much has also been learned that will improve the future surveys.

The most important lesson is that the offshore industry and the MMS can work well together on the shared goals of safe and clean OCS oil and gas operations outside of the traditional regulatory context. Not only have we been able to work together, but our detailed discussions undoubtedly helped each of us to better understand the nature of existing problems and how to best address them. Without this information, some well-intended regulatory solutions can result in inefficient or ineffective use of both MMS and company resources. Clearly, the OCS Performance Measures are better for the give and take of our negotiations and, more importantly, they are more widely supported.

A significant lesson learned during implementation of the measures has been that each company and the MMS must be talking about the same universe of activities when discussing that company's performance. Many companies on the OCS have spun off independently operating subsidiary companies for various reasons. Much of the overall approach to safety and environmental protection used by these subsidiaries is, however, still dictated by the parent company. During this survey, most companies reported data for all their subsidiary companies in one data report to the MMS. These reports did not, for the most part, identify the range of companies from whom the data was derived. The MMS was left to guess the names of all subsidiary companies in order to draw corresponding data from its databases. This resulted in some mismatches that took a substantial amount of time to work out. In many cases, the company contact was not even aware of the legal name of all its subsidiaries; this too took time to work out. The MMS intends to alleviate this problem in the next data collection by asking companies to specifically list all companies for whom their survey response applies.

This survey revealed that the data validation phase of compiling and data quality control took substantially more time to complete than was anticipated. Each significant discrepancy between the data maintained by individual companies and that maintained by the MMS needed investigation. The procedures for data validation obviously need to be clarified. For the next round of data collection in early 1999, the MMS will specifically list the procedures OCS operators can use to harmonize their data with that kept by the MMS. Many of these changes must be initiated in the MMS District Offices. Those offices provide much of the data input effort within the MMS and are the most appropriate office to make justifiable revisions. The experiences of this survey will, we expect, lead many operators to take steps during the year to reconcile data differences with the MMS. Recognizing the continuous nature of data collection and

improvement, the Steering Group decided to freeze the database at the end of each collection period and to focus improvements on future collections. To do otherwise would invite constant revision of the data, with only a marginally improved product.

Lastly, observed inconsistencies in data submittals by different OCS operators require several smaller clarifications. These clarifications do not, however, require revisions to the definitions of the OCS Performance Measures. Notably among the clarifications:

1) Any lost workday injury must have a corresponding recordable injury (i.e., lost workday is a subset of recordable). Several operators submitted lost workday statistics, but listed no recordable injuries.
2) Restricted- or light-duty injuries are considered lost workday injuries and should be counted as such.
3) Data covering injuries or accidents incurred during contract seismic operations should be submitted under the Drilling, Workover, and Allied Services category.
4) Oil spill volume data should be reported under this survey in barrels of oil spilled, or fractions thereof. Several operators appeared to mix units (gallons and barrels).
5) All transportation-related accidents arising during OCS oil and gas operations or supply activities should be included under the appropriate category. This determination is consistent with the definition of each of the injury measures, but seemed to provide some confusion. The Steering Group agreed that to impose artificial limitations (e.g., only on the platform/rig, only on the lease, etc.) would require additional bookkeeping, yet would add little value.

Changes to the Data Request Form and the Measures

The Steering Group reviewed all data developed from the data collection survey and subsequently debated how future surveys, and even the measures themselves, could be improved. The Steering Group agreed that significant revisions to the measures were neither desirable nor necessary. The most significant revision for the next data collection survey will be to the data collection form itself. The form used in this survey inappropriately required operators to make unnecessary calculations. Several of these calculations depended on additional data that needed to be supplied by the MMS. The Steering Group has decided to revise the data collection form to eliminate all calculated fields. Those changes have now been made and resubmitted to the Office of Management and Budget (OMB) in accordance with their procedures for Federal information collection activities. A copy of the draft, revised data collection form can be found in Appendix 4 to this report. The MMS expects to send the final, approved data collection form covering calendar year 1998 OCS activities to all OCS operators in February 1999.

In addition to changes to the data collection form, the Steering Group agreed that one minor revision was needed to clarify reporting definitions for the NPDES measure. The Work Group, in developing the NPDES measure, incorrectly agreed to request only information on NPDES permit exceedences. Members of the Work Group subsequently clarified that exceedences are only one, though the largest, category of NPDES non-compliance actions. The revised definition for NPDES <u>non-compliances</u> now reads:

> Each operator submits the number of NPDES non-compliances listed on the Discharge Monitoring Report (DMR) to the EPA annually on a staggered quarterly schedule. Operators should include all the non-compliances from OCS

leases reported on all DMR's submitted during the applicable ***calendar year.*** For this measure, the severity of the non-compliance is not quantified; e.g., a test result that may only be slightly above that which is allowed is counted the same as a missing test.

A column for exceedences is provided for each discharge criterion on the DMR. This column documents only sample measurements that exceed maximum (and/or minimum or 7-day average as appropriate) permit requirement for each parameter. Exceedences of monthly averages, missing tests, discharges of prohibited substances, etc., are documented at the bottom of the DMR form under the heading, "Comments and explanation of any Violations" with appropriate documentation attached. All exceedences and individual non-compliances should be counted. The operator is responsible for summarizing data for the reporting cycle and providing this information to EPA.

Overall, the Steering Group does not expect this revision to either cause much additional work for OCS operators, or to have a significant impact on the overall results from this measure. It does, however, more accurately reflect compliance with EPA's NPDES program.

NEXT STEPS

Distribution of Results: Internet & Trade Associations

The Steering Group agreed that the most expeditious and cost-effective route for distribution of this report and the performance measures data was via the Internet. Accordingly, the MMS agreed to post the full report and all data charts on its Safety Page (http://www.mms.gov/eod/safety.htm). This posting makes the performance measures data available in several formats to facilitate the speed and ease of transfer and subsequent internal use by OCS operators and other interested parties. Each of the major trade associations (API, IADC, IPAA, NOIA, and OOC) agreed to inform their members how to find the OCS Performance Measures and to help get printed copies to the few members of their associations who did not have easy access to the Internet.

Pacesetter Best Practice Sharing Workshop

The Work Group early on decided that one of the most immediate uses for the performance measures data would be joint industry-MMS best practice sharing workshops. Previous SEMP workshops have proven to be an extremely cost-effective approach to helping all OCS operators learn new ways to improve their SEMP systems and plans. These workshops are designed to provide a public forum for pacesetter companies to share the management systems and process measurement indicators they use to achieve superior performance.

Using the results of the 1996 and 1997 survey, the MMS selected pacesetters, with concurrence from the Steering Group, and solicited their participation in the proposed best practice sharing workshops. The survey results showed that a lot of companies shared "pacesetting" performance in any one measure. To facilitate selection of pacesetters, the Steering Group established the following criteria:

1) A pacesetter must have participated in the performance measures data survey in both 1996 and 1997 for the category in which they were chosen. An exception was allowed for

companies that did not submit data in the construction category since many operators did not separate that data from their production data during those years.

2) A pacesetter's performance must have been at or near the best performance in a category.
3) A pacesetter's exceptional performance had to be sustained in both 1996 and 1997.
4) No pacesetter company can present for more than one category. It was agreed that there is a high value on presenting a variety of approaches to good performance.
5) The relative level of effort of different operators (i.e., other reported data - hours, production, wells drilled, etc.) would be used to decide close calls where needed.
6) Each pacesetter chosen must be taking a systematic approach to managing the category of performance they were chosen to present (SEMP is a primary consideration).

Pacesetting operators were chosen in two categories - those producing greater than 30 million BOE per year and those producing less than this amount - to highlight the management approaches taken by pacesetting companies of different sizes. Two pacesetters, one from each category, will present an overview of the management systems they use to achieve their good performance in the following areas: production and construction personnel safety; drilling personnel safety; prevention of oil spills and NPDES permit exceedences; and MMS regulatory compliance.

These workshops were scheduled for November 1998 in both New Orleans (11/10/98) and Houston (11/12/98) (see *Appendix 3* for more information on the workshops).

Request for 1998 OCS Performance Measures Data

The Steering Group and MMS have agreed on plans for conducting the next data collection survey. In February 1999, pending approval from the OMB, the MMS will issue an NTL requesting all relevant information from each operator's OCS oil and gas activities during calendar year 1998. This NTL will contain the revised data collection form discussed above (see *Appendix 4* for a draft copy of this form). Operators will be asked to submit this information no later than the end of March 1999. This information will, once again, be combined with pertinent data from the MMS databases and validated with each participating company. The aggregate data will be disseminated to participants and the OCS industry in the same fashion employed to distribute this report and the data from 1996 and 1997.

APPENDICES

Appendix 1. Notice to Lessees NTL 98-6N and 1996-1997 Data Collection Form

Appendix 2. OCS Performance Measures Charts

Appendix 3. Notice to Lessees NTL 98-15N (Pacesetter Workshop Announcement)

Appendix 4. Information Collection Notice for 1998 and Draft Data Collection Form